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EXAMINER	
ROSARIO, DENNIS	

ART UNIT	PAPER NUMBER
2624	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patents@woodcock.com

Office Action Summary	Application No.	Applicant(s)	
	10/009,790	GEUSEBROEK, JAN-MARK	
	Examiner	Art Unit	
	Dennis Rosario	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *RCE 11/20/07*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/20/07 has been entered.

Response to Amendment

2. The amendment was received on 11/20/07. Claims 1-28 are pending.

Response to Arguments

3. Applicant's arguments, see amendment, page 11, line 14-18 filed 11/20/07, with respect to "Ortyn...fails to disclose...the combined gradient and smoothing operator are carried out in one pass" have been fully considered and are persuasive. The rejection of claims 1-28 has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Chen et al. (US Patent 5,710,829).

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1,2,8,10-12,15,17,18,22,23,25 and 27 are rejected under 35 U.S.C. 102(e) as being anticipated by Chen (US Patent 5,710,829).

Regarding claim 1, Chen discloses a method of autofocus of an optical instrument for viewing an object and having an auto-focusing mechanism, comprising the steps of:

step 1: acquiring a first digital image (corresponding to fig. 12,num. 50) of the object through the optical instrument, the first digital image comprising a plurality of pixels having pixel values;

step 2: applying a digital gradient filter (fig. 1,num. 30) to at least some of the pixel values of the first digital image to obtain a focus score (fig. 5,num. 51) for the first digital image; the digital gradient filter (fig. 1,nu,. 30) comprising (as shown in fig. 5,numerals 50-56) a combined gradient (fig. 5,num. 51 obtains a "focus gradient" in col. 7, line 49) and smoothing (fig. 5,num. 52) operator that carries out both gradient and smoothing operations in one pass (as shown by the structure of fig. 5 that is a pipeline structure that does repeat operations or go back to numeral 50 from numeral 56; further evidence of the claimed "one pass" is shown in fig 12, numerals 50-202 that shows a parallel pipeline structure that does not repeat operation or go back to numeral 50 from numeral 202); wherein the smoothing operation has a settable spatial extent (by "assign[ing]" in col. 7, line 66 a pixel to "one block" in col. 7, line 66 or a plurality or "overlap[ping]" in col. 7, line 67 blocks).

Regarding claim 2, Chen discloses the method of claim 1, wherein the spatial extent of the smoothing function is manually (corresponding to an implied user that "preferably" in col. 7, line 65 sets the block size) and/or electronically settable.

Regarding claim 8, Chen discloses the method according to claim 1, wherein the digital filtering function combined gradient and smoothing operator is a one or two (as indicated by the 2-D image in fig. 7)-dimensional function.

Regarding claim 10, Chen discloses the method according to claim 1, further comprising the step of selecting (as discussed above in claim 1 with respect to "assigning a pixel") the spatial extent of the smoothing operation.

Claims 11,12,18,22,23 are rejected the same as claims 1,2,8,1,2. Thus, argument similar to that presented above for claims 1,2,8,1,2 of a method is equally applicable to claims 11,12,18,22,23 of an instrument or mechanism.

Regarding claim 15, Chen discloses the optical instrument according to claim 11, the instrument being further adapted for determining from a plurality of focus scores for a plurality of images (corresponding to "The focus of each block is measured" in col. 7, lines 47,48) a focus position (or "foreground" in col. 7, line 59) for the object.

Regarding claim 17, Chen discloses the optical instrument according to claim 15, the instrument being adapted to determine for each image a plurality of focus scores using a plurality of spatial extents (corresponding to "The focus of each block is measured" in col. 7, lines 47,48) for the combined gradient and smoothing operator.

Claim 25 is rejected the same as claim 8. Thus, argument similar to that presented above for claim 8 is equally applicable to claim 25.

Claim 27 is rejected the same as claim 15. Thus, argument similar to that presented above for claim 15 is equally applicable to claim 27.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 3,9,13,19,21,24,26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. (US Patent 5,710,829) in view of Hartman (US Patent 4,592,089).

Claim 3 is rejected the same as claim 1. Thus, argument similar to that presented above for claim 1 is equally applicable to claim 3 except for the additional limitation of:

a) wherein the combined gradient and smoothing operator (fig. 5,numerals 51 and 52) is defined by the linear correlation or convolution ("convolution" in col. 6, line 56) of the pixel values with a mathematical smoothing function (or "Gaussian function" in col. 7, line 2 that blurs). Chen does not teach the remaining limitations of claim 3, but teaches measuring focus based on "edge strength" in col. 8, line 10 and preferably uses "Sobel edge detection" in col. 8, line 15.

Hartman teaches detecting edges via zero-crossing of a derivative corresponding to figures 10,11B and 12B and the remaining limitations of:

a) having a negative and positive lobe around the origin (as shown in fig. 10) thereof, the mathematical smoothing function (said CSSMTH) having only one zero crossing (as shown in fig. 10) and being limited in spatial extent (fig. 10 shows limits P1 and P2) in that it extends over a distance (as shown by the doubled headed arrow in fig. 9) smaller than or equal to the image size (as shown in fig. 10 that has a length of P1 to P2) and extends (as shown by a larger double headed arrow in fig. 8) at least over three pixels (as shown by the dashed box in fig. 8) either side of a pixel (fig. 8: (X0, Y0)) whose value is being filtered (corresponding to said smoothing function that "copes" in col. 10, line 38 for noise that is "amplified" in col. 10, line 39 due to the "differentiation process" in col. 10, line 40.)

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Chen's edge detection with Hartman's teaching of edge detection, because Hartman's teaching of edge detection can "ignore the spurrious boundary and detect the correct one" in col. 10, lines 67,68.

Claims 9,13,19,24 and 26 are rejected the same as claim 3. Thus, argument similar to that presented above for claim 3 is equally applicable to claims 9,13,19,24 and 26.

Claim 21 is rejected the same as claim 2. Thus, argument similar to that presented above for claim 2 is equally applicable to claim 21.

8. Claims 4,5,7,16 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. (US Patent 5,710,829) in view Frost et al. (US Patent 5,647,025).

Regarding claim 4, Chen does not teach claim 4, but teaches obtaining a "focus gradient" in col. 7, line 49.

Frost teaches a method of obtaining "gradient focus scores" in col. 8, line 2 and teaches claim 4 of:

step 3: moving the object relative to the optical instrument along the optical axis thereof (corresponding to fig. 5,num. 503) and acquiring a second digital image (fig. 5, num. 509) and a second focus score (fig. 5, num. 511) therefore in accordance with the method of steps 1 and 2;

step 4: continue moving the object relative to the optical instrument along the optical axis thereof (corresponding to "successive positions of the stage" in col. 6, lines 21,22) in the same direction in accordance with steps 1 to 3 to acquire at least three digital images (corresponding to fig. 5, num. 509) and first to third focus scores (corresponding to fig. 5,num. 511) associated therewith ; and

step 5: determining from the first to third focus scores (corresponding to the vertical axis of scores in fig. 7) a focus position (corresponding to the horizontal axis in fig. 7 of focus position and fig. 11, num. 1109) for the object and moving (via fig. 11, num. 1110) the object and/or the optical instrument to this position.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Chen's focus gradient with Frost's gradient focus scores, because Frost's teaching of gradient focus scores obtains the "best focus" in col. 2, line 4.

Regarding claim 5, Chen does not teach claim 5, but teaches obtaining a "focus gradient" in col. 7, line 49.

Frost teaches a method of obtaining "gradient focus scores" in col. 8, line 2 and teaches claim 5 of:

Claim 5 is rejected the same as claim 4. Thus, argument similar to that presented above for claim 4 is equally applicable to claim 5 except for the additional limitation as taught in Chen of:

a) determining a first plurality of focus scores (corresponding to "The focus of each block in measured" in col. 7, lines 47,48) for the first digital image using the digital gradient filter with a first plurality of spatial extents (corresponding to "assign[ing]" in col. 7, line 66 a pixel to "one block" in col. 7, line 66 or a plurality or "overlap[ping]" in col. 7, line 67 blocks) by applying for each spatial extent (that is set to a single block or a plurality of overlapping blocks) the method steps 1 and 2.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Chen's focus gradient with Frost's gradient focus scores, because Frost's teaching of gradient focus scores obtains the "best focus" in col. 2, line 4.

Regarding claim 7, Frost of the combination teaches the method according to claim 4, wherein the determining step includes fitting the focus scores (represented as the vertical axis of fig. 7) to a polynomial function (fig. 7,num. 704) and moving the object and/or the optical instrument (corresponding to fig. 11,num. 1110) to a position related to a maximum (or a zero-crossing of a derivative) of the polynomial function.

Claims 16 and 28 are rejected the same as claim 7. Thus, argument similar to that presented above for claim 7 is equally applicable to claims 16 and 28.

9. Claims 6 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. (US Patent 5,710,829) in view Ortyn et al. (US Patent 5,841,124).

Regarding claim 6, Chen does not disclose claim 6, but teaches using a video camera represented in fig. 1 as num. 10.

Ortyn teaches using a video camera represented in fig. 2 as num. 512 that is attached to the claimed microscope, fig. 2, num. 510 of claim 6.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Chen video camera with Ortyn's video camera with microscope, because Ortyn's video camera with microscope provides images of "clinical value" in col. 1, line 27.

Claim 20 is rejected the same as claim 6. Thus, argument similar to that presented above for claim 6 is equally applicable to claim 20.

10. Claim 14 rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. (US Patent 5,710,829) in view of Hartman (US Patent 4,592,089) as applied to claim 3 above, and further in view of Ortyn et al. (US Patent 5,841,124).

Regarding claim 14, Chen of the combination does not disclose claim 14, but teaches using a video camera represented in fig. 1 as num. 10.

Ortyn teaches using a video camera represented in fig. 2 as num. 512 that is attached to the claimed drive device, fig. 1A, num. 504 of claim 14.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Chen's video camera with Ortyn's video camera with drive device in fig. 1A,num. 504 for the same reasons as claim 6, above.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Silver et al. (US Patent 6,408,109 B1) is pertinent as teaching a method of building a smoothing function into "gradient estimation kernels" in col. 7, line 10.

Price et al. (US Patent 5,790,692) is pertinent as teaching a method of a blur function, fig. 9c which corresponds to the claimed smoothing and edge detection in fig. 9b which corresponds to the claimed gradient.

Duvent (US Patent 4,701,782) is pertinent as teaching a method of edge detection via derivatives as indicated in fig. 1.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dennis Rosario whose telephone number is (571) 272-7397. The examiner can normally be reached on 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella can be reached on (571) 272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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